REMARKS

Claims 1-14 are rejected under 35 USC §103 as being unpatentable over Scalora, U.S. 6,262,830, in view of Knapp et al., U.S. 6,077,569.

Independent claim 1 recites an optical device having a plurality of high index layers comprising high index degenerately doped materials and a plurality of low index layers comprising high thermal and electrically conductive materials. A mirror structure is formed by creating alternating layers of the plurality of high index layers and the plurality of low index layers having a relationship

$$E_{g,l} > E_{g,h} > hc/\lambda$$

where $E_{g,h}$ is the band gap of a high index material used in the high index layers, $E_{g,l}$ is the band gap of a low index material used in the low index layers, λ is wavelength of light of interest, h is Plank constant, and c is the speed of light so that electricity and heat is conducted through the optical device. The index difference between the plurality of high index layers and plurality of low index layers is greater than 0.3.

Scalora '830 describes a transparent metal structure that permits the transmission of light over a tunable range of frequencies, for example, visible light, and shields ultraviolet light, and all other electromagnetic waves of lower frequencies, from infrared to microwaves and beyond. The transparent metal structure comprises a stack of alternating layers of high index material and low index materials, at least one of the materials being a metal.

Knapp et al. '569 describes an improved method for the deposition of highly durable and abrasion-resistant multilayer dielectric antireflective coatings and reflective colored mirror coatings onto plastic lenses.

Scalora '830 does not teach or suggest a plurality of high index layers comprising ***high index degenerately doped materials*** and a plurality of low index layers comprising high ***thermal and electrically conductive materials***. Scalora '830 describes using alternating layers of Ag/MgF_2. There is no discussion that the high index layers comprise high index degenerately doped materials and the low index layers comprise high thermal and electrical conductivity materials. One of ordinary would not associate air and glass as being high index degenerately doped materials and high thermal and electrical conductivity materials.

Moreover, Scalora '830 does not teach or suggest forming ***a mirror*** structure by creating alternating layers of the plurality of high index layers and the plurality of low index layers having a relationship

$$E_{g,l} > E_{g,h} > {}^{hc}\!/_{\lambda}$$

so that ***electricity and heat*** is conducted through the optical device. Scalora '830 only describes the formation of transparent metal structure. There is no discussion of forming dielectric mirror structures as recited in claim 1.

Knapp et al. '569 describes the formation of a dielectric coating that is applied to plastic lenses. The formation of layers is not the same or equivalent to the application of a coating to a plastic lenses. Secondly, Knapp et al. does not teach or suggest the formation of a mirror structure utilizing the materials described in Knapp et al. '569. Therefore, the combination of Scalora '830 and Knapp et al. '569 does not render claim 1 obvious.

As to claims 2-14, they are dependent on claim 1, respectively. Therefore, claims 2 -14 are also allowable for the same reasons argued with respect to claim 1.

Claims 1 and 29 is rejected under 35 USC §103 as being unpatentable over Duck et al., U.S. 5,615,289.

Independent claim 29 recites a Fabry-Perot device that includes a plurality of high index layers comprising high index degenerately doped materials and a plurality of low index layers comprising high thermal and electrically conductive materials. The Fabry-Perot device also includes a top mirror that includes alternating layers of the plurality of high index layers and the plurality of low index layers, and a cavity structure that includes a bulk of a selective material. The Fabry-Perot also includes a bottom mirror that includes alternating layers of the plurality of high index layers and the plurality of low index layers. The high index layers and the low index layers having a relationship

$$E_{g,l} > E_{g,h} > hc/\lambda$$

where $E_{g,h}$ is the band gap of a high index material used in the high index layers, $E_{g,l}$ is the band gap of a low index material used in the low index layers, λ is wavelength of light of interest, h is Plank constant, and c is the speed of light so that the top mirror and bottom mirror allow electricity and heat to be conducted through the Fabry-Perot device. The index difference between the plurality of high index layers and plurality of low index layers is greater than 0.3.

Duck et al. ‘289 describes a bandpass filter that is formed within an optical filter in the form of a Bragg grating. The grating includes multiple Fabry Perot cavities disposed along the waveguide. Each of the cavities includes a pair of reflectors. Each reflector comprises alternating high-low index regions within the waveguide. The number of high/low regions within a reflector is selected in accordance with the refractive index difference between two alternate adjacent regions.

Arguments regarding Scalora '830 presented heretofore are also applicable in this rejection.

Claims 1 and 29 recite that the high and low index layers follow the relationship $E_{g,l} > E_{g,h} > hc/\lambda$. Duck et al. '289 does not teach or suggest limiting its alternating high and low index materials using the recited relationship. Moreover, Duck et al. '289 relies heavily on the fact that each reflector comprises alternating high-low index regions within a waveguide, each region having thickness of one quarter-wave at a bandpass wavelength, each alternate region being of a different index of refraction than an adjacent region. This is contrary to what the invention, as recited in claim 29, uses to provide an optical device that can also be thermally and electrically conductive. Again, the $E_{g,l} > E_{g,h} > hc/\lambda$ relationship establishes the parameters for which the invention will successfully operate.

It will be appreciated that Duck et al. '289 does not describe having the index difference between the plurality of high index layers and plurality of low index layers as being greater than 0.3. Duck et al. '289 does describe the use of alternating layers of high and low indexes that have an index different of 0.001. The index difference of the claimed invention as compared to that of Duck et al. '289 is a factor of 300. This would imply that the structure described in Duck et al. '289 would have a length approximately 300 times smaller as it is described in the patent. That device would not be able to conduct both electricity and heat because of its dimensions. Therefore, Duck et al. '289 does not render claim 29 obvious.

Furthermore, Duck et al. '289 does not recite having high index layers comprising high index degenerately doped materials and the low index layers comprising high thermal and electrical conductivity materials. Duck et al. '289 describes having high and low index layers to

form an optical filter, but there is no discussion of the materials being used to form such a structure. Therefore, the combination of Scalora '830 and Duck et al. '289 does not render claims 1 and 29 obvious.

In view of the above amendments and for all the reasons set forth above, the Examiner is respectfully requested to reconsider and withdraw the rejections made under 35 U.S.C. § 103. Accordingly, an early indication of allowability is earnestly solicited.

If the Examiner has any questions regarding matters pending in this application, please feel free to contact the undersigned below.

Respectfully submitted,

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